MEDICAL PROCEEDINGS

MEDIESE BYDRAES

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REDAKSIONEEL · EDITORIAL

MONDELINGE ANTI-DIABETIESE BEHANDELING

Een van die voortreflike vorderings vir sover dit die behandeling van diabetes mellitus betref, was die ontdekking gedurende die afgelope jare dat 'n chemiese gedefinieerde stof beheer oor ligte gevalle van hierdie siekte kan uitoefen as dit mondeling toegedien word. ‚Ligte gevalle' sluit in middeljarige en bejaarde pasiënte ‚wat tans te veel weeg of in die verlede te swaar was, wat betreklik weerstandskragtig teen insulienterapie is, en wat, as hulle nie behandel word nie, selde ketoties word'.[1]

Die navorsingswerk wat gedoen is met karbutamied (BZ 55) (een van die vroeë geneesmiddels met hierdie eienskappe) het aangetoon dat hierdie soort mondelinge terapie van geen waarde was vir die behandeling van ‚ernstige' of ‚jeugdige' suikersiekte nie, omdat insulien noodsaaklik vir die geslaagde beheer oor sodanige gevalle is.

Karbutamied ('n sulfanilamiedderivaat) het egter gou-gou in onguns geraak weens die toksiese newe-effekte daarvan. Toe ons hierdie probleem vroeër vandeesjaar in oënskou geneem het,[2] het ons die aandag gevestig op die feit dat ondersoek ingestel word na ander samestellings wat miskien meer belowend sou wees, en waarskynlik die vermoë sou besit om die onderliggende moeilikhede met diabetiese metabolisme te verbeter sonder om die pasiënt aan ongeregverdigde en heeltemal onaanneem-

1. Walker, G. *et al.* (1957): Brit. Med. J., **2**, 323.
2. Redaksioneel (1957): Med. Bydraes, **3**, 25.

ORAL ANTI-DIABETIC TREATMENT

One of the outstanding advances in the treatment of diabetes mellitus has been the discovery, in recent years, that a chemically defined substance is active by mouth in the control of mild cases of this disorder. The category of mild cases includes middle-aged or elderly patients 'who are or have been overweight, who are relatively resistant to insulin, and who, even when untreated, rarely become ketotic'.[1]

The studies with carbutamide (B Z 55) (one of the early drugs with these properties) showed that this kind of oral therapy was of no value in the treatment of 'severe' or 'juvenile' diabetes, as insulin is essential for the successful management of these cases.

Carbutamide (a sulphanilamide derivative) rapidly fell into disfavour because of its toxic side effects. When reviewing this problem earlier this year[2] we drew attention to the fact that other compounds were under investigation the underlying difficulty in diabetic metabolism which might offer more promise in repairing without involving the patient in unwarranted and wholly unacceptable risks. We predicted, at that time, that this chapter in metabolic investigation was by no means closed. It is a tribute to the perspicacity and the pertinacity of the organic chemists that, within a short time, they appear to have fulfilled our prediction.

1. Walker, G. *et al.* (1957): Brit. Med. J., **2**, 323.
2. Editorial (1957): Med. Proc., **3**, 25.

like risiko's bloot te stel. Ons het destyds voorspel dat hierdie hoofstuk in metaboliese navorsingswerk nog geensins klaargeskryf is nie. Dit is 'n huldeblyk aan die skranderheid en die volhardingsvermoë van die organiese skeikundiges dat hulle ons voorspelling binne 'n baie kort tydjie skynbaar bewaarheid het.

Uitgebreide kliniese proefnemings is tans uitgevoer in die Verenigde State (5,593 gevalle), die Verenigde Koninkryk (op 'n kleiner skaal)[1, 3, 4], die Vasteland van Europa (meer as 800 gevalle)[5, 6] en, laaste maar geensins die minste nie, in Suid-Afrika[7] met 'n nuwe derivaat bekend as tolbutamied (D 860). Die beskikbare gegewens dui daarop dat hierdie middel doeltreffend is vir die mondelinge behandeling van ligte diabetes en dat dit skynbaar baie minder toksies as sy voorgangers is. Die Suid-Afrikaanse navorsingswerkers veral het melding gemaak van die ‚aangename vryheid van toksiese effekte' toe hulle tolbutamied gebruik het.

Chemies is tolbutamied nie verwant aan insulien nie. Die struktuurformule daarvan dui aan dat dit, in 'n chemiese sin, 'n sulfonamiedderivaat is, met die sulfoniel-ureum-kompleks as die metabolies aktiewe deel van die molekule. Dit is heeltemal anders as die sulfanilamiede, wat bekend is weens hul bakteriebestrydende eienskappe.

In ooreenstemming met hierdie chemiese verwantskap is dit derhalwe nie verbasend om te vind dat tolbutamied geen mikrobe-bestrydende effek het nie en dat dit farmakologies òf die afskeiding van insulien bevorder, òf die insulien-vernietiging in die weefsels verminder.

Hoewel die manier waarop dit werk nog nie heeltemal duidelik is nie, is dit in elk geval reeds byna seker dat tolbutamied die intra-lewer-glukose-metabolisme verbeter.

Omdat tolbutamied 'n nuwe middel is, moet dit met versigtigheid gebruik word, en die geneesheer behoort die pasiënte wat hy daarmee gaan behandel sorgvuldig te kies en nougesette toesig oor hulle te hou. Walker *et al.*[1] wys daarop dat dit voorgeskryf moet word ‚slegs vir volwassenes wat nie te vet is nie, wie se diabetes nie deur middel van dieet alleen gekontroleer kan word nie, en wat nie ketoties word selfs wanneer hulle nie behandel word nie. Die reaksie kan onmiddellik of miskien eers na etlike weke sigbaar word.'

Dunlop[8] verstrek 'n opsomming van die intensiewe navorsingswerk wat op hierdie gebied by die Terapeutiese Afdeling van die Universiteit van Edinburgh gedoen is, en dui dan die maatstawwe aan wat toegepas moet word by die seleksie van die gevalle wat met tolbutamied behandel kan word:

‚1. Dit moet persone wees wat die siekte opgedoen het ná hul veertigste jaar;

Extensive clinical trials have now been carried out in the United States (5,593 cases), the United Kingdom (on a smaller scale),[1, 3, 4] the European Continent (over 800 cases)[5, 6] and, last but not least, in South Africa,[7] with a new derivative known as tolbutamide (D 860). The available data suggest that this drug is effective in the oral control of the mild diabetic and is apparently very much less toxic than its predecessors. The South African investigators commented particularly on the 'pleasing freedom from toxic effects' when tolbutamide was used.

Tolbutamide is not chemically related to insulin. Its structural formula indicates that it it, in the chemical sense, a sulphonamide derivative, the metabolically active portion of the molecule being the sulphonyl-urea complex. It is distinct from the sulphanilamides, which are well known for their anti-bacterial properties.

In correspondence with this chemical relationship it is not surprising to find that tolbutamide has no known anti-microbial action and pharmacologically it either stimulates the secretion of insulin or decreases insulin destruction in the tissues. Although its mode of action is still a matter for speculation, it seems that, in any event, tolbutamide improves intra-hepatic glucose metabolism.

Because tolbutamide is a relatively new drug, it should be used cautiously and patients treated with it should be selected and supervised carefully. Walker *et al.*[1] point out that it should be given 'only to adults who are not excessively overweight, whose diabetes cannot be controlled by diet alone and who do not become ketotic even when untreated. The response may be evident immediately or only after several weeks'.

Dunlop,[8] summarizing the intensive research in this field in the Department of Therapeutics at the University of Edinburgh, has outlined the criteria for selecting cases to be treated with tolbutamide:

'1. They should have developed the disorder over the age of 40;

3. Butterfield, W. J. H. *et al.* (1957): Brit. Med. J., **2**, 325.
4. Crowley, M. F. *et al.* (1957): Brit. Med. J., **2**, 327.
5. Bänder, A., Creutzfeldt, W. *et al.* (1956): Dtsch. Med. Wschr., **81**, 823.
6. Bänder, A., Creutzfeldt, W. *et al.* (1956): Dtsch. Med. Wschr., **81**, 887.
7. Jackson, W. P. U., Linder, G. C. *et al.* (1957): S.A. Tydskr. Geneesk., **31** 146.
8. Dunlop, D. M. (1957): Brit. Med. J., **2**, 351.

3. Butterfield, W. J. H. *et al.* (1957): Brit. Med. J., **2**, 325.
4. Crowley, M. F. *et al.* (1957): Brit. Med. J., **2**, 327.
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6. Bänder, A., Creutzfeldt, W. *et al.* (1956): Dtsch. Med. Wschr., **81**, 887.
7. Jackson, W. P. U., Linder, G. C. *et al.* (1957): S. Afr. Med. J., **31**, 146.
8. Dunlop, D. M. (1957): Brit. Med. J., **2**, 351.

2. Hulle moet nie reeds vroeër 'n neiging getoon het om ketosis maklik te ontwikkel nie;

3. Hul daaglikse insulienbehoeftes moet nie 40 eenhede oorskry nie;

4. Hul vastende bloedglukose wanneer hulle geen insulien kry nie, moet nie 300 mg. per 100 ml. oorskry nie.

Slegs ongeveer twee-derdes van die pasiënte wat aan hierdie maatstawwe voldoen kan uiteindelik as geskik vir hierdie soort behandeling beskou word. Van diegene wat nie gunstig reageer nie, sal 'n klein persentasie wat skynbaar aan 'n ligte vorm van suikersiekte ly, gou-gou ketosis ontwikkel ná die terugtrekking van insulien, sodat die vervanging van insulien met tolbutamied altyd onder sorgvuldige hospitaaltoesig moet geskied. Die hiperglikemie van byna alle swaarlywige suikersiektelyers kan ook gekontroleer word deur tolbutamied wat egter bloot die swaarlywigheid sal bestendig; die korrekte behandeling vir sulke persone is dieetbeperkings wat op sigself voldoende is om die swaarlywigheid teë te werk, en die hiperglisemie tot 'n normale peil sal terugbring.

Dit is 'n saak van die allergrootste belang dat die lot van die lyer aan ligte suikersiekte verbeter kan word op 'n eenvoudige, veilige en doeltreffende manier wanneer hy gekies word ooreenkomstig die maatstawwe waaroor die navorsingswerkers op hierdie gebied nou algemeen ooreenstem. Sonder die minste twyfel het die deeglike en uitgebreide kliniese toetse met tolbutamied nou 'n nuttige en bevredigende nuwe wapen tot ons terapeutiese krygstuig gevoeg.

2. They should have shown no previous tendency to develop ketosis easily;

3. Their daily insulin requirements should not exceed 40 units;

4. Their fasting blood glucose when receiving no insulin should not exceed 300 mg. per 100 ml.

Only about two thirds of patients satisfying these criteria prove ultimately suitable for this form of treatment. Of those who do not react favourably a small proportion even of seemingly mild diabetics will quickly develop ketosis after the withdrawal of insulin, so that the substitution of tolbutamide for insulin should always be made under careful hospital supervision. The hyperglycaemia of nearly all obese diabetics can also be controlled by tolbutamide, which, however, will merely perpetuate the obesity; the correct treatment for such persons is dietary restriction, which by itself will correct the obesity and restore the hyperglycaemia to normal levels.'

It is a matter of considerable importance that the lot of the mild diabetic, when he is selected according to the criteria now generally agreed upon amongst workers in this field, can be alleviated in a simple, safe and effective manner. There can now be little doubt that the thorough and extensive clinical tests of tolbutamide have provided a useful and satisfactory addition to our therapeutic armamentarium.

MATERNAL DEPRIVATION

ITS EMOTIONAL AND NUTRITIONAL EFFECTS

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Recent advances in our knowledge of the effects of maternal deprivation have contributed to our understanding of the epidemiology of emotional and nutritional disturbances. These contributions have significant and immediately practical meaning for medical care.

Maternal deprivation is a term used to describe any situation in which a child is deprived of affectionate mothering or, to use Bowlby's description, 'a warm, intimate, and continuous relationship with his mother (or permanent mother substitute) in which both find satisfaction and enjoyment'.[2] The situations in which a child may be deprived of mother love are many and varied. Among the more important and common circumstances, the following may be included:

1. *Separation from the mother without her replacement by a satisfactory mother substitute.*

(*a*) This may be permanent as a result of the mother's death or her removal from the home, such as in certain psychiatric conditions, and as a result of the mother's deserting her family.

(*b*) More common than a permanent separation is that in which mother and child are separated for varying periods of time. The admission of mother or child to an institution such as a hospital is not an uncommon present-day happening. Perhaps even more significant in South Africa is the frequency with which infants and young children do not live with their parents continuously, staying for varying periods of time with relatives. This is particularly noticeable among the largest section of our population, viz. the African.

2. *Living with a mother or permanent mother-substitute, who has a poor relationship with the child.* This varies from occasional extreme examples of rejection and openly expressed hostility to partial deprivation of mother love. Of interest in this latter regard

is the changed relationship between a mother and her child on the birth of a succeeding baby. Study of the changed relationship, and hence of the child's care in the home, should provide a most fruitful approach to the prevention of serious disorder from developing in the displaced child.

THE EMOTIONAL IMPLICATIONS

Psychiatric studies of children committing serious delinquencies indicate that such children have many clinical features in common. These typical features have been summarized by Bowlby as follows:

'Superficial relationships;
No real feeling—no capacity to care for people or to make true friends; an inaccessibility, exasperating to those trying to help;
No emotional response to situations where it is normal—a curious lack of concern; deceit and evasion, often pointless; stealing;
Lack of concentration at school.'

He uses the term affectionless character to describe such personalities. Hitherto the less descriptive diagnoses 'psychopathic personality' and 'psychopathic conduct or behaviour disorders' have been made in these cases. His suggestion provides a more meaningful diagnosis in its emphasis on the main pathological process involved in the individual's inability to establish warm and intimate relationships.

The etiology of this clinical syndrome has been studied by a number of independent workers, including Levy,[8] Lowrey,[9] Spitz[14] and Bowlby.[2]

Their studies have been comprehensively reviewed.[2] A striking feature common to these studies was the finding that these children had had markedly disturbed relationships with their mothers of the kind defined above as constituting maternal deprivation. A further problem reported upon[11] is the difficulty of carrying out psychotherapy with such children because of the inability of the child to establish relationships with the therapist.

The possible significance of the association between a history of separation from the mother and the development of an affectionless character, with stealing as an important manifestation, is suggested by Bowlby's comparative study of his case material at a child guidance clinic in London. Dividing the cases he had seen at this centre into those who were reported as stealing and the others who, although emotionally disturbed, had not stolen, he found a significant difference in the two groups. Firstly, of the 44 children reported as thieves, 14 had been diagnosed as affectionless characters. None of the 44 other cases were so diagnosed. Secondly, 17 of the thieves 'had suffered complete and prolonged separation (6 months or more) from their mother or established foster-mothers during their first year of life'. There were only 2 of the other children who had had a similar experience.

While separation from mother is an important aspect of deprivation, even more important perhaps is the kind of substitute arrangement that is made. When lasting or temporary separation is unavoidable (and it must be remembered it is even desirable in some cases), the provision made for the child's care is a major determinant of his future health. This has been well demonstrated in Goldfarb's carefully controlled studies[4] of New York children aged 10-14 years, who had been separated from their mothers in the first year of life. He compared 15 pairs of children who had been admitted to an institution in the first instance and then, at about the age of 3 years, had been placed in foster-homes, with an otherwise similar group who had been placed in foster-homes from infancy and, therefore, had not had the experience of living in an institution. In other respects the children resembled one another. The standard of physical hygiene maintained at the institution was high, in fact the maintenance of this high standard was a factor in producing a high degree of social isolation, e.g. 'babies below the age of 9 months were each kept in their own little cubicles to prevent the spread of epidemic infection'. A series of psychological tests indicated that the groups who had been in an institution during the first 3 years of life differed significantly from those who had had foster-home care from early infancy.

All of the 'institution' group had a poor record of schooling, and most of them were unable to concentrate, restless and hyperactive, fearful and craving affection. Very few had developed a capacity for establishing relationships or the ability to keep rules and, on breaking rules, few evidenced a sense of guilt. In the 'foster care' group the reverse was found. Furthermore the foster care group was superior in intelligence, reading, arithmetic and speech development; these children had a markedly higher ability to conceptualize and a higher rating in their social maturity.

When it is remembered that the 'institution' groups were removed from the institu-

tion at the age of 3 years to foster-homes of similar quality to those in which the others had been cared for since early infancy, Goldfarb's findings gain even greater significance. The significance of mothering during the first 3 years of life is demonstrated to be critical, not only during this period of infancy and early childhood, but as having profound implications for future social, emotional and intellectual development.

In studying children who had been separated from their mothers in infancy or early childhood, caution is required in interpreting the results. Separation itself and the kind of substitute arrangement made have now been shown to be of vital importance to the child's health. It must be remembered that the cause of the initial separation is itself of considerable significance. An unsatisfactory home is often the reason for the child's being removed from home.

A recent study of deprived children of Kent County, England, by Lewis,[20] has provided further information on the importance of the home background. While confirming the high incidence of serious mental disturbance in children separated from their mothers for prolonged periods before the age of 5 years, further analysis of the family life situation confirms that the effects of deprivation are not restricted to separation. Thus she found a fairly strong link between long-standing awareness of being unwanted and a tendency to be violent and antagonistic. The unwanted child, lacking parental affection or even being disliked, whose aggression was often unsocialized, differed from those whose background she defines as one of 'neglect and bad company'. These included children who had lived in very dirty, ill-kept homes, as well as those who had been neglected by their parents or where there had been marked inconsistency in parental affection and discipline, and children who had associated with delinquents in their own homes or in the neighbourhood. While aggression was a common finding in these children they tended to be 'socialized delinquents' with membership in a gang. Of interest is her finding that the dirty and ill-kept home *per se* was not a common background feature of disturbed behaviour. A large proportion of children from such homes was normal.

Both the above groups of disturbed children were contrasted with a third group, viz. those subjected to 'constraint' in one form or another. This group included children who had two or more of the following features in their home background: rigid routines, excessive discipline, domination and lack of warmth within the home, as well as social isolation and overprotection.

There was a high incidence of neurotic behaviour in this group. Many were over-inhibited, submissive and moody, sometimes being quarrelsome and aggressive. Anxiety with insecurity was a common feature, and disturbed sleep and bed-wetting were common.

She stresses the overlapping that can, and does occur in the clinical condition of these 3 groups and the frequency with which one feature in the home background can merge into the other. Thus the first group, 'parental rejection', can readily lead to neglect and the keeping of bad company or to abnormal constraint.

As indicated in the introductory remarks on the meaning of the term maternal deprivation, it is important to bear in mind that a child living with his parents can be, and often is deprived.

THE NUTRITIONAL IMPLICATIONS

The nutritional implications of maternal deprivation may be of a direct kind in which the child suffers through lack of adequate feeding. In addition, it may be that the emotional state of the child influences the way in which food is utilized.

The direct effects of inadequate feeding are readily appreciated and will, therefore, not be discussed at length here. One of the most interesting studies[17] concerned with emotional determinants of nutritional state and growth in children arose in the course of a series of tests into the effects of different diet supplements carried out by a British team of nutritionists in Germany after World War II. The children studied were living in two small orphanages, their diet being scarcely sufficient for their needs. The particular study with which we are concerned was aimed at determining the influence on the growth of these children of additional bread, extra jam to smear on the bread and concentrated orange juice.

First the children of both hostels were weighed and measured every fortnight for 6 months and then those in one hostel received as much additional bread as they wanted to satisfy their appetites, whereas the other group

received no extra supplements. Weights and measurements were continued in both hostels for a further 6 months.

Two interesting results emerged during the course of the study:

1. The children of one hostel (A) gained very much more weight than those of the other (B) during the first 6 months, when neither group was receiving any additional food.
2. During the second 6 months the position was reversed. In spite of the extra food provided for the children at A, their average growth rate was less than it had been during the first 6 months when no additional food was supplied. At B, on the other hand, the weight curve immediately began to rise steeply, although these children were getting only their German rations as before.

The factor producing this unexpected result was clearly not the diet. It was found to be related to the personalities of the women in charge. During the first 6 months Miss S. had been in charge of orphanage B; the person in charge of A resigned at this time and as the children at A started on supplementary feeding Miss S. was appointed to this orphanage and a new woman in charge was appointed to replace her at B. The failure in growth of the children at B during the first 6 months and at A during the second 6 months, was thus apparently related to Miss S., the common factor. This was borne out by a study of her approach to her work. By contrast with the other two women in charge, 'she was older, rather stern and forbidding, and she ruled the home with a rod of iron. Children and staff lived in constant fear of her reprimands and criticisms, which sometimes seemed quite unreasonable'.

Further evidence pointing to Miss S. as the main factor responsible was the progress found to have occurred in children who were her favourites. Eight children whom she favoured when she was in charge of B were transferred with her when she took over A. This was done at her request. The growth of these 8 children was different from that of the others. During the first 6 months, while they were living at B with Miss S., their growth was superior to that of the other children in their hostel, and when they were transferred to A and had the additional diet, their growth was even more markedly superior.

The failure of the other children at A who were receiving supplements could not be related to their not eating extra food; measurements of the food eaten showed that they 'were eating more than the children at B, and 20% more than they themselves had eaten during the first 6 months'.

The conclusion that failure to grow in response to additional food is related to unhappiness and discontent is suggested by the failure of those children who were at different times in the care of Miss S.

The nutritional implications of maternal deprivation, be they of a direct dietary nature or secondary to the child's emotional state, are of such significance in this country that they will be considered in more detail. The possible role of maternal deprivation in the epidemiology of kwashiorkor in early childhood is of particular significance in Africa, where kwashiorkor is probably the commonest syndrome of serious acute nutritional failure.

The earliest description of the syndrome in Africa was a note by Procter in 1926 on its occurrence in Kenya.[10] In South Africa, Dr. Shena Ross of Lovedale[12] described it in 1931 as a new syndrome of African infants of the Ciskei. She considered the diagnosis of infantile scurvy satisfactorily described her cases. However, her description and illustrations leave no doubt that she described what is now known as kwashiorkor. Williams[18, 19] provided the first full clinical description in African children in 1933 and 1935, from her experience with cases in West Africa. Using a local name for the disease, she was the first to employ the term kwashiorkor. During the past 20 years a number of workers in various parts of Africa has pursued pathological, clinical and epidemiological studies of the condition. Recent reviews by Brock and Autret[21] and Trowell, Davies and Dean[15] include several features of particular interest to our present consideration:

(*a*) *Retardation of Growth.* While this occurs in association with various forms of malnutrition and undernutrition, it is a consistent and important feature in cases of kwashiorkor. Our own studies at the Institute of Family and Community Health among African infants in Durban and in rural Polela, and studies by others in Africa,[16] show the following features:

i. While birth weights are below those of average middle class babies in Europe and the United States of America, weight growth during the first 3-4 months is often accelerated by comparison with these children.

ii. After this period the rate of weight growth decelerates and by the age of 1 year African infants' weights are well below expected standards in countries like Britain and America.

iii. Later still, during the later phases of breast feeding and following complete weaning from the breast to other foods, the deceleration is often even more marked than in phase (ii).

(*b*) *Weaning.* All workers are agreed that, with rare exceptions, the syndrome of

kwashiorkor occurs after weaning the baby. Discussing the condition among the Baganda attending clinics near Kampala, Uganda, Welbourn[16] states:

'"obwosi" is the Luganda word for a wasting condition accompanied by fading in the colour of the hair and skin, which occurs in babies who are weaned too soon. A common cause of premature weaning is a second pregnancy: obwosi is regarded as a disease of the displaced child . . . the older child fades away as the younger one increases in strength and vitality. Africans believe that the younger child is in some way a kind of spiritual parasite upon his older brother.'

The possible significance of displacement will be considered further below.

The age incidence of the disease in 1,141 cases has been analysed[15] as follows:

	Percentage of Total Cases (1,141)
2-6 months	2
6-12 months	15
1-2 years	45
2-3 years	24
3-4 years	7
4-5 years	5
5-9 years	2
9-20 years	0.2

Ninety-six per cent of all the cases occurred between the ages of 6 months and 5 years, with 69% in the age period 1-3 years. In a smaller series of cases admitted to the Johannesburg General Hospital, Gillman and Gillman[3] reported 79% as occurring between the ages of 1 and 3 years.

The significance of the common occurrence of kwashiorkor at these age periods is its correspondence with the common age of complete withdrawal of breast feeding associated frequently with displacement of the infant by a new baby. More common than the fully developed syndrome are relatively mild signs of kwashiorkor in the displaced child. Attention to home care of the displaced child by physicians and nurses in the course of their practice is thus not only desirable, but is also an essential part of medical care and health education directed towards improved child nutrition, and the prevention of kwashiorkor.

Cultural anthropological studies of various African groups all refer to the indulgent early feeding relationships between mother and baby and the continuation of breast feeding for periods of 2 to 3 years and sometimes longer. Another feature which many African groups have in common is their attitude towards a further pregnancy when an infant is still being breast fed. Not only is it considered undesirable for the mother of a young infant to become pregnant but, if this occurs, breast feeding is stopped immediately the mother is aware of her condition.

Following a description of the typical indulgent feeding relationship among the Basuto, Ashton[1] makes the following significant comments on the change in relationship after weaning:

'The child is prepared for weaning by his neighbours mocking him when he runs to his mother to suck. . . . The process (of weaning) is usually concluded, especially if weaning has to be ended abruptly owing to premature pregnancy, by positive action, such as the mother tying a cloth around her breasts or rubbing bitter tobacco or aloe juice on her nipples. Alternatively, the child may be taken to his grandparents till he has "forgotten" his mother.

This event completely changes the relationship of the child with his mother and so opens the way to the use of force as well as reason. The child is now expected to be old enough to understand and therefore to obey his parents' orders and so is treated with far less consideration and coaxing than before. . . . . When he cries or makes a nuisance of himself, he is shouted at and told to be quiet, is threatened with a thrashing or is left alone; if he is hungry, he is told to wait until someone is free to come and feed him.'

Krige[7] refers to the removal of the Zulu child from his mother at the time of weaning. Traditionally it would seem that the child was removed to the mother's maiden home but it is now a common practice to wean the child by putting it in the care of the father's mother in whose hut it now sleeps away from its mother.

The practice of removing the weaned child from the mother to the mother's original home, and in many cases transferring responsibility for his care from his mother to the father's mother are of much interest in our consideration of maternal deprivation. Separation of the child from mother may vary from a short to prolonged periods of time, involving a change in mother-figure at a time when the infant has learned to identify his mother as a defined person and has established his first basic intimate relationship with her.

Even in those cases where the child is not separated from the mother, a changed relationship of the kind described by Ashton can be of considerable clinical significance and is, therefore, worthy of the closest attention in medical practice.

(*To be continued*)

TRANSACTIONS OF THE ASSOCIATION OF PLASTIC SURGEONS OF SOUTHERN AFRICA

HIROSHIMA — AND AFTER*

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A fine, warm day—6 August 1945. It was clear in Hiroshima at 8.10 a.m. on what appeared to be a normal summer's morning. Children were walking to school or playing in the grounds. Lightly clad workers were hurrying to the city. Trains and buses were crowded and the street cars were filled with busy people. There had been an 'all clear' signal following the usual 'weather planes' and no one was perturbed. At 8.15 a.m. the Atomic Age burst on Hiroshima as a blinding flash that destroyed a city and 240,000 people.

A description of what happened at that second is well related by Prof. Shogo Nagaoka, curator of the Peace Memorial Museum at Hiroshima:

'Three United States B 29's had approached the city of Hiroshima from the north-eastern direction, maintaining an altitude of approximately 8,500 meters as observed by an anti-air artillery unit. One of them stopped its engines and as it glided over across the central part of the city, it dropped a single atomic bomb and, making an abrupt right-angled turn, darted away at full speed. At the time of the bomb explosion, it had flown 16 kilometers to the northwest, somewhere in the San-in District.

The bomb fell rapidly with a trail of thick, red column of flame in its wake and one and a half minutes later, at a height of 570 meters above the ground level, it exploded with a terrific detonation in a fire ball 60 meters in diameter. The temperature of the fire ball, often referred to as a "miniature sun", is estimated at 300,000°C., 1/10,000 of a second after the detonation.

The terrific explosion sent reddish blue or dark brown flames shooting out against the ground at an astounding velocity, radio-activating some 40% of the city area. Simultaneously a cluster of white smoke became visible, which, centering around a mass of dark red cloud and enveloped in a yellowish mass of cloud, mushroomed upward, topped with a crest of white cloud. This cumulus-like development is referred to as the "atomic cloud". The Atomic Energy Commission of the U.S. disclosed that it rose to a height of 3,000 meters in 48 seconds and in 8½ minutes it had reached 9,000 meters, just below the stratosphere.

Fifteen minutes after the atomic cloud started surging upward, carrying with it radio-activated particles, rain began to fall. For the first 2 hours it was muddy rain and then there was drizzling for another 6 hours. This brought the radio-active particles back to the ground. Pressure from the blast flattened almost all buildings within 2.5 kilometers of the hypocenter.

About 20 minutes after the explosion, fires broke out all over the city and the conflagration into which they rapidly developed, devoured all the buildings it could lay its hands on. In this unprecedented holocaust (Figs. 1–3), more than 260,000 persons lost their lives and more than 100,000 were more or less injured.

With the bomb were dropped 3 automatic signalling units contained in cylinders 80 cm. long and 15 cm. in diameter equipped with parachutes. They were later found in the wood of Kameyama, Asa-gun. Each consisted of 4 compartments which housed pressure-measuring apparatus, vacuum tubes and batteries, with antennae several meters long attached to the upper end. Further investigation showed that they were transmitters operating on 20 meter bands, with an output power of 40 watts, and so designed that the wave length changed with the atmospheric pressure under which it operated, thus enabling the operators to ascertain whether the bomb was actually detonated or not.

Investigation to determine the explosion center indicated that the hypocenter was the yard of the Shima Hospital, Saiku-machi, and the epicenter about 570 meters above the point. Both the hypocenter and the epicenter had a diameter of about 60 meters.

Simultaneously with the explosion, the heat rays kindled fires at various places all over the city, even as far as 3,700 meters from the explosion center. The wood and paper sliding doors, straw, electric poles, wooden houses and clothes, particularly of darker colours, were

* A paper read in September 1957 at the Durban Meeting of the Association of Plastic Surgeons of Southern Africa.

Figs. 1-3. Devastation after the atom bomb explosion.

some of the things that easily caught fire from the heat rays and this constituted major sources of the subsequent conflagration. Remarkable instances of such ignition are seen in electric poles, wooden houses, railroad sleepers, cargo mine posts and bamboo brushes, all of which showed charred surfaces facing the explosion center.

Kitchen fires and other sources of heat in the flattened houses were further causes of the conflagration. Thus 5 minutes after the explosion, smoke began to go up and 20 minutes later fires were observed in Komachi, Kokutaiji, Nakajima-cho, Tokaichi-machi, Tenma-cho, Funairi-cho area, spreading rapidly over the entire city.

Those who barely survived the terrific blast had received ugly burns from the rays and suffered from wounds caused by falling timbers and fragments of glass. Dazed and confused, they did not even know what to do to save their own lives. With all means of communication completely paralyzed, rescue parties from neighbouring communities were delayed

and with all fire-fighting organs destroyed, the whole city was left to the mercy of raging fires, so that by 2 o'clock in the afternoon the entire city was enveloped in a vast sea of flames. Although its intensity gradually decreased towards evening, the fire continued into the night, with the flames licking at the night sky. Towards 10 o'clock the next morning it gradually became localized, but still kept on burning for 3 more days, and the embers went on smouldering for over a week.

Evidence of the intensity of the rays flashing from the bomb for an extremely short duration is to be found in its effect on granite, andesite, sedimentation and metamorphic rocks and on roof tiles where the superficial chemical composition was found to be altered. Numerous shadows could be observed imprinted on building materials, steel plates and ceramic wares. Most striking are those seen on the Yorozuyo Bridge near what was the prefectural office. Ten persons walking east to west have left their shadows permanently imprinted on the railing and on the tar-paved surface.

Three factors are supposed to have worked together almost simultaneously with the explosion, on human bodies.

i. *The terrific heat,* which (within 4,000 meters from the hypocenter) burned the exposed skin, which was then ripped off by the following blast. The skin thus affected either peeled off or hung in peels. Most of the persons with more than 20% of the body surface thus wounded either died on the spot or a short period later.

ii. *The violent concussion,* by which many persons were pinned down or buried under falling structures, or showered with the splinters of flying glass.

iii. *The radio-activity.* Wounds caused by it are further classified into primary and secondary radiation wounds.

More than 240,000 persons are believed to have been killed, of whom 170,000 were civilian and 70,000 military; 51,012 were persons seriously injured, 105,543 slightly injured and 6,738 missing.

The city limits of Hiroshima enclose a total area of 18,000 acres of which 8,200 acres had been in use for various city activities. Physical damage extended over a total area of more than 7,500 acres and fires following the bomb explosion consumed everything in an area amounting to 3,280 acres.

The blast alone brought total destruction to 6,820 buildings and houses, and dealt major damage to 3,750. The fires that followed the blast burnt down 56,111 buildings and houses besides seriously damaging 2,290. The following illustrates the damage up to 2 kilometers from the hypocenter:

From 0-0.5 kilometer, there were 5,608 buildings of which 5,608 were destroyed (100%).
From 0.05-1.0 kilometer, there were 14,059 buildings of which 14,059 were destroyed (100%).
From 1.0-1.5 kilometers, there were 14,598 buildings of which 14,598 were destroyed (100%).
From 1.5-2.0 kilometers, there were 10,752 buildings of which 10,451 were destroyed (99.2%).'

A more personal description of the bomb explosion is well drawn by Dr. Hachiya, Director of the Hiroshima Communications Hospital and the author of *Hiroshima Diary.* He writes:

'The shortest path to the street lay through the house next door so through the house we went—running, stumbling, falling, and then running again until in headlong flight we tripped over something and fell sprawling into the street. Getting to my feet, I discovered that I had tripped over a man's head. "Excuse me! Excuse me, please," I cried hysterically. There was no answer. The man was dead. The head had belonged to a young officer whose body was crushed beneath a massive gate.

We stood in the street, uncertain and afraid, until a house across from us began to sway and then with a rending motion fell almost at our feet. Our own house began to sway, and in a minute it, too, collapsed in a cloud of dust. Other buildings caved in or toppled. Fires sprang up and, whipped by a vicious wind, began to spread. I paused to rest. Gradually things around me came into focus. There were the shadowy forms of people, some of whom looked like walking ghosts. Others moved as though in pain, like scarecrows, their arms held out from their bodies with fore-arms and hands dangling. These people puzzled me until I suddenly realized that they had been burned and were holding their arms out to prevent the painful friction of raw surfaces rubbing together. A naked woman carrying a naked baby came into view. I averted my gaze. Perhaps they had been in the bath. But then I saw a naked man and it occurred to me that, like myself, some strange thing had deprived them of their clothes. An old woman lay near me with an expression of suffering on her face; but she made no sound. Indeed one thing was common to everyone I saw—complete silence'.

Bleeding profusely from cuts by flying glass, Dr. Hachiya was rescued by his friends, who carried him to his hospital on a stretcher. Soon after, however, they noticed that the hospital was on fire so his stretcher was moved into the garden.

'The sky filled with black smoke and glowing sparks. Flames rose and the heat set currents of air in motion. Updrafts became so violent that sheets of zinc roofing were hurled aloft and released, humming and twirling, in erratic flight. Pieces of flaming wood soared and fell like fiery swallows. While I was trying to beat out the flames, a hot ember seared my ankle. It was all I could do to keep from being burned alive.

The Bureau started to burn, and window after window became a square of flame until the whole structure was converted into a crackling, hissing inferno.

Scorching winds howled around us, whipping dust and ashes into our eyes and up our noses. Our mouths became dry, our throats raw and sore from the biting smoke pulled into our lungs. Coughing was uncontrollable. We would have moved back, but a group of wooden barracks behind us caught fire and began to burn like tinder.

The heat finally became too intense to endure, and we were left no choice but to abandon the garden. Those who could, fled; those who could not, perished. Had it not been for my devoted friends, I would have died.

Huge raindrops began to fall. Some thought a thunderstorm was beginning and would extinguish the fires. But these drops were capricious. A few fell and a few more and that was all the rain we saw'.

Later on Dr. Hachiya's bewilderment was aggravated by the development of symptoms of a new disease—radiation sickness. It was only after the nature of the bomb was made clear that the diagnosis of the disease became evident. The number of deaths that took place during the first month from this condition was indeed alarming.

In those who recovered, the superficial evidences of injury were the scars due to radiation flash burns, upsetting the victims psychologically and interfering with function.

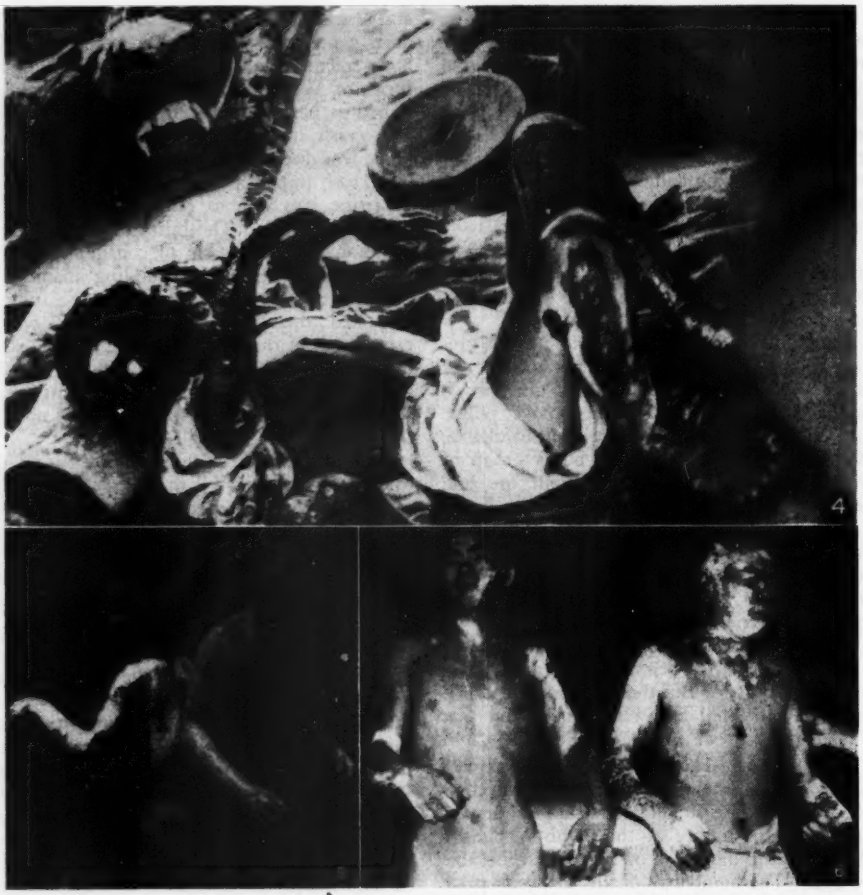
To help these people and also the Japanese doctors treating them, an organization known as the Hiroshima Peace Centre Associates was set up to provide plastic surgical repair of the damaged tissues. In the first instance, the work was carried out in the United States but later was transferred to Hiroshima. The observations here recorded are concerned with the second phase of the project.

Although the patients seen were virtually the casualties of war, the injuries were in many respects unlike other military casualties. In World War I and the 'minor' wars of Spain and Palestine, most of the injuries were of a deep penetrating nature often associated with bony fractures and muscle laceration. The injuries of World War II have often been described as being due to crash, crush and burn. The crash injury, which so often pulverized bone, was due to high speed vehicles or planes. The crush injury, associated with the bombing of cities, was due to falling debris and the collapse of walls. The burn, one of the most common types, was due to continuous fire in a cockpit, a tank or in a building aflame. In the course of experience, these injuries separated themselves into numerous typical types, each in the main requiring a fairly standardized system of approach. But the atom bomb casualties of Hiroshima presenting themselves for plastic surgery treatment did not fall into any of these 'typical' categories.

Very few people within 800 meters of the hypocenter lived to tell the tale. Most of the casualties seen were between 1,000 and 2,500 meters of the hypocenter at the time of the explosion. Of these casualties more than 91% of our series were outdoors at the time of the explosion and it is interesting to speculate why this would be the case.

The bomb killed people in many ways: the intense heat of the fireball, the blast, the subsequent conflagration or radiation sickness; although many others died of drowning, exposure, or starvation. There were not many shockproof reinforced concrete buildings in Hiroshima. The result was that most of the buildings collapsed under the power of the blast and were in a short time destroyed by the flames which spontaneously arose all over the city due to the intense heat of the bomb. Most people caught in these houses were destroyed in one way or another. Those who were outside and more than 1,000 meters from the bomb stood the best chance of survival.

Nearly all of the cases seen were suffering from the effect of burns. The distribution of the scars was quite characteristic, being found most commonly on the back of the hands, forearms, elbows, arms and shoulders and also the back itself (Figs. 4–10). For some unknown reason the left side was affected more than the right. Burn scars of the face and the front of the body were present, of course, but were not common. Most of the cases concerned suffered from epilation, although in no case was this of a permanent nature. This seems to indicate that at the time of the flash these patients were able to protect themselves to a certain extent by curling up into a sort of foetal position. In



Figs. 4-8. Burns caused by atom bomb blast showing typical distribution and posture.

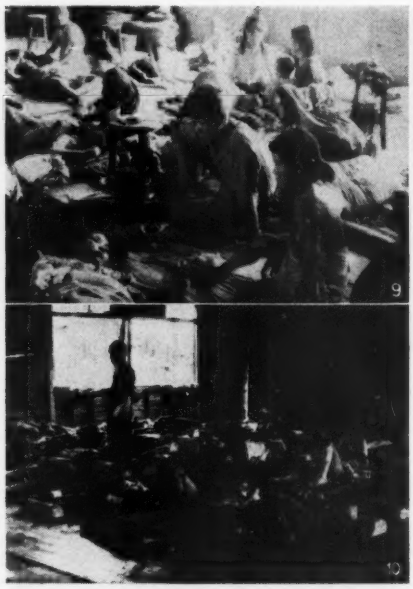
order to do this there must have been a lag period, however small, between the intense light and the intense heat and although this conjecture was not accepted at first, its probability was agreed to by Dr. Lowell Woodbury of the Atomic Bomb Casualty Commission, who was consulted on this point. Apparently there is a spontaneous enormous thermal output by the bomb at the moment of fission which is reduced for 12 milliseconds. At this time the fireball begins to expand and from 0.3 to 1.0 second reaches the zenith disappearing after 3 seconds. The radiation effect is therefore felt from 0.3 second to 1 second after fission has occurred, which is adequate time for reflex protection. A case is recorded of a man who watched the bomb fall, described it in detail and saw it explode. Yet he was able to close his eyelids in time. Although his eyelids and face were burnt, his eyes were completely protected from the heat and showed no pathological after-effects whatever.

Any substance flicked by the flash of the bomb had its chemical composition changed, but because the effect was of such short duration, only the outer surfaces were affected beyond a certain distance from the fireball. On the one hand, the heat was able to change the chemical composition of the surface of roof tiles and even the streets; on the other hand, a single leaf hanging against the wall was able to protect that part of the wall from radiation effects. The effect on human beings was similar. Exposed parts of the body received intense

burns, but in no instance was the underlying muscle or bone affected. Scalp epilation was very common, but pubic and under-arm epilation rare and of doubtful causation. Clothing, which was thin at the time, gave adequate protection for most of the body, even when it was blown off by the blast, except when the clothes caused secondary burns by catching fire. The clothing was usually dark, for dark colours absorb heat whilst white reflects it. Many more victims would have been saved from the effects of the burns if their clothing had been white and if it had covered the whole body. It appears that some form of protection is possible, particularly in view of the slight delay between the flash and the heat. The colour and style of protective dress for any future atomic war is therefore obvious.

Most of, in fact almost all, the burns healed with 'keloid' formation; and in the early investigations it was problematical whether radiation from the bomb created keloid and also whether long-term constitutional effects were to be expected.

In the series of cases examined and treated in this project 12 years after the dropping of the atom bomb, not a single case showed true keloid formation (Figs. 11, 12). True keloid formation is to be expected in scars formed in areas where there is no tension or where the skin is thin —such as in the lobes of the ears or in the eyelids. Where there is much tension or where the skin is thick, hypertrophic scars are a normal expectation. Full thickness injury to the skin of the back or the extensor surfaces of the shoulder, arms, elbows, forearms and hands would normally result in a thick scar. In the presence of sepsis and malnutrition, and in the absence of early skin replacement by grafting, there is a manifold exaggeration of this tendency toward hypertrophic scar. The fact, therefore, that early examinations of the atom bomb victims showed thick scars should not be interpreted as due to a peculiarity of the Japanese or of the bomb. By the same token,



Figs. 9-10. Hospitalization after the explosion.

patients who survived acute radiation sickness, with few exceptions recovered completely. No case of permanent epilation has been reported and no acute effects were evident after 6 months.

Long-term effects are still under investigation and will continue so for many years to come. Confusing factors have contributed to the difficulty of obtaining correct statistics from the very start. It is not generally known, for example, that 376 cases of dysentery were notified in the first month after the dropping of the bomb. This was not surprising, considering that the water and sewerage systems had virtually been destroyed and chaos reigned. At this time, however, cases were dying by the thousands of acute radiation sickness, the symptoms of which are similar to those of gastro-intestinal infection. How many of these were cases of dysentery or typhoid fever will never be known.

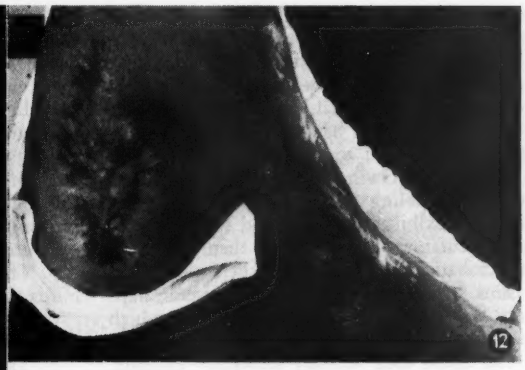
The two long-term effects that do seem to show a definite increase is the incidence of leukaemia and cataract formation. Even here there is a certain amount of confusion, as cataract did not occur in some of the cases whose eyes were directly exposed to the blast and leukaemia was found in people who were not in Hiroshima at the time of the bombing. In spite of this, the statistical evidence does seem to show a positive result.

The effect on genetics will not be uncovered for several generations to come. Up to the moment, however, the birth rate in Hiroshima is within normal limits for Japan; 12 babies were born of mothers pregnant at the time of the bomb. All appeared to be normal, except that there was a suspicion that the cephalic measurements were smaller. Whether this pseudo-microcephaly will have any effect on the intelligence of these children is not known yet. It is unlikely.

None of the traumatic cataracts observed following the explosion has required treatment. Although they have not disappeared, they have not increased in size, and in no case has vision been sufficiently disturbed to warrant surgery. At present there is no cure for leukaemia. It is therefore evident that the greatest number of people directly affected by the bomb with the possibility of assistance, are those who were burnt by it and are today suffering from the scars attributed to those burns. These scars create difficulty either because their contractures interfere with the function of that part of the body; or because of their unsightliness. Usually it is both. But before discussing our considered system of treatment to alleviate these difficulties, it is necessary to define what we understand as being keloid, since the diagnosis of this condition affects the issue considerably.

The term 'keloid' has been used loosely in contrast to 'hypertrophic scar' both by investigators in this field and by casual workers. Some have considered that every thick scar is a keloid. Others have indicated that the difference is that a keloid is mobile whilst a hypertrophic scar is fixed. This cannot be accepted as a differentiation, because fixity depends on the depth of the injury and not on the nature of the skin. Any injury down to or involving deep fascia may cause fixity and, with the development of an areolar tissue plane between the deep fascia and the skin, the fixity disappears.

Hypertrophic scar is normal in cases where there is much skin loss, where the skin is thick, where there is skin tension and where infection occurs, especially in the presence of exuberant granulations. Such hypertrophic scars tend to soften and reduce in time in contrast to the true keloid, which remains static. True keloids are often found in areas where there is no skin loss, tension or infection. The Africans often produce enormous keloids of the ear lobes merely by perforating them, although the condition may perhaps be aggravated by slight infection.



Figs. 11-12. Burn scars 12 years later showing typical distribution and softening of massive hypertrophic scars.

At the early examination of the patient it is impossible to tell, either microscopically or macroscopically, whether a specific scar is a keloid unless other old scars are evident which indicate that the patient is a keloid former. When the diagnosis is uncertain, it may be necessary to carry out a small trial operation in order to assess the possibilities before inflicting long-term plastic surgical treatment on an unsuitable patient.

All the scars of the atom bomb casualties seen by me were 12 years old. All of them had softened except along lines of pull, and therefore the conclusion was drawn that there were no true keloid formers amongst them. Any treatment decided on could be offered without the risk of aggravating the condition.

By virtue of the distribution of the scars and the time lag since their inception, distant flaps were seldom necessary. One-, or in a few cases, two-stage procedures were adequate.

Z-plastic operations were found satisfactory in most contracture cases.

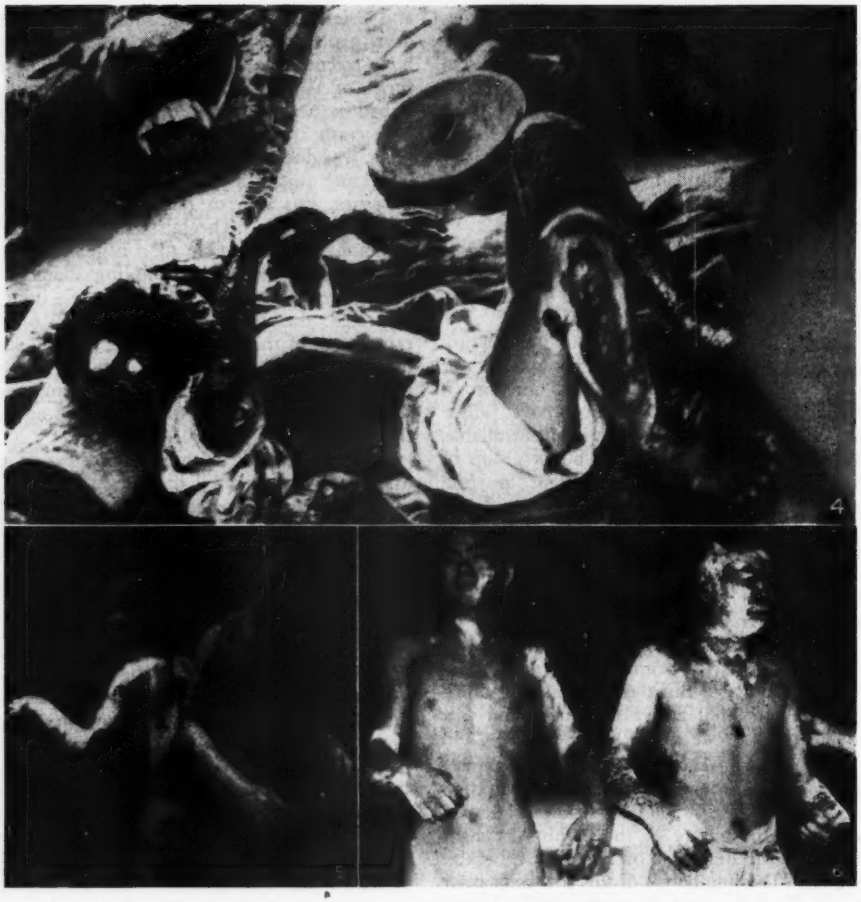
Nearly all of them might have required massive flap surgery if seen and treated 8-10 years before. Softening of their scars made local flap adjustments possible. Except for minor repairs around the commissure of the mouth, other forms of local flap treatments, apart from the Z-plasty, were seldom possible owing to skin loss over broad areas.

Free graft replacements were the usual methods of repair. The types used were mainly thin or split skin grafts, although small, full thickness grafts were used on the face and composite grafts containing hair or cartilage were applied for the formation of eyebrows or the ala of the nose.

Even in the presence of intense scarring of the skin, the underlying deep fascia was usually intact and smooth, thus allowing for an easy take for the graft; and it was quite astonishing to note the flexibility of the metacarpophalangeal joints, which came down to a normal flexed position after having been pulled into an extension of 160° by scar for 12 years. It appears that in a young person the permanent 'shortening' of interossei does not occur if their insertions into the dorsal expansions of the fingers have not been injured. This contrasts with the conditions observed in the burnt hand in both military and civilian casualties in Europe and other places where exposure to the heat was for a longer time. The treatment of the burnt hand in other fields of conflict constituted plastic surgery's greatest challenge during the World War II.

In dealing with grafts or scars in the vicinity of joints, care was taken to bring the incision lines along the axes of the joints even when normal skin was to be sacrificed. There was thus no pull or thickness of the scar edge; but apart from technical precautions, there seems to be a tendency towards good healing by the Japanese patients.

The pedicle flap was seldom used in this series of cases and then usually on cases where injury was due to a falling object rather than



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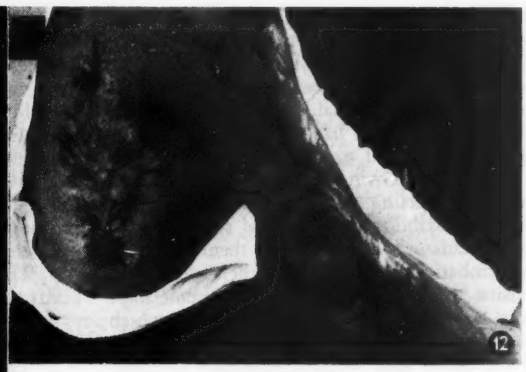

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Nearly all of them might have required massive flap surgery if seen and treated 8-10 years before. Softening of their scars made local flap adjustments possible. Except for minor repairs around the commissure of the mouth, other forms of local flap treatments, apart from the Z-plasty, were seldom possible owing to skin loss over broad areas.

Free graft replacements were the usual methods of repair. The types used were mainly thin or split skin grafts, although small, full thickness grafts were used on the face and composite grafts containing hair or cartilage were applied for the formation of eyebrows or the ala of the nose.

Even in the presence of intense scarring of the skin, the underlying deep fascia was usually intact and smooth, thus allowing for an easy take for the graft; and it was quite astonishing to note the flexibility of the metacarpophalangeal joints, which came down to a normal flexed position after having been pulled into an extension of 160° by scar for 12 years. It appears that in a young person the permanent 'shortening' of interossei does not occur if their insertions into the dorsal expansions of the fingers have not been injured. This contrasts with the conditions observed in the burnt hand in both military and civilian casualties in Europe and other places where exposure to the heat was for a longer time. The treatment of the burnt hand in other fields of conflict constituted plastic surgery's greatest challenge during the World War II.

In dealing with grafts or scars in the vicinity of joints, care was taken to bring the incision lines along the axes of the joints even when normal skin was to be sacrificed. There was thus no pull or thickness of the scar edge; but apart from technical precautions, there seems to be a tendency towards good healing by the Japanese patients.

The pedicle flap was seldom used in this series of cases and then usually on cases where injury was due to a falling object rather than

to a burn. One such case was a girl whose toes were mutilated or destroyed; the big toe was involved in a scar and pulled over. She wanted this toe separated so that she could wear a Japanese sandal, and although a calf cross-leg flap would have been most comfortable, she preferred to use the opposite thigh as the donor. Owing to the natural Japanese habit of kneeling or squatting, there is an amazing flexibility of joints and suppleness of the musculature which enables them to accept an acrobatic position which their occidental cousins would find intolerable. Distant flaps were usually zig-zag, tubed pedicles which allowed elongation of the flap and easy closure of the donor area without secondary grafting.

One word about the complications relative to the atom bomb burn. Three cases of carcinoma have come to our knowledge. All these had been given X-ray treatment in an attempt to reduce scar and were in no way directly due to the bomb. Only one chronic ulcer was seen. This was in the centre of a thick scar behind the knee. The breakdown was obviously due to movement and not related to the atom bomb directly. Excision and free graft cured the condition by releasing the pull. In other words, no condition was found in these burn scars in any way different from burn scars from other sources.

It seems that we are coming to the end of the physical aftermath of the atom bomb explosion over Hiroshima. But what it has done to the hearts and minds of men and women all over the world will not be erased in our generation.

On 6 August 1945, at 8.15 a.m., a man was sitting on the granite steps of a bank in Hiroshima when the atom bomb exploded and blasted him into eternity. Not only was he dissolved, but the stone around him underwent a permanent chemical change. Although this unknown person has disappeared, where he sat he left his shadow as permanent evidence of his existence. That man's shadow is both a warning and a symbol. It is a warning of what might happen to everyone everywhere if mankind's wisdom does not keep pace with his scientific ingenuity; but it may be a symbol of peace if the warning is well taken.

SUMMARY

1. A description of the atom bomb explosion over Hiroshima is given.

2. Its physical effect on the population is described.

3. The most wide-spread permanent effect was due to the flash burn in victims caught between 1,000 and 2,500 metres from the hypocentre.

4. It appears that in most cases the burn affected the backs of the hands, arms and the back itself (in an attempt at protection). The left side was affected more frequently than the right, possibly because the right hand was carrying something at the time—books, briefcase, etc.

5. The flash burn created full thickness burns of the skin and no deeper than the skin.

6. The relationship between hypertrophic scar and keloid is discussed.

7. Treatment by plastic surgery is described as carried out during phase 2 of the project of rehabilitation initiated by the Hiroshima Peace Centre Associates.

8. General comment.

OPSOMMING

1. 'n Beskrywing van die atoombomontploffing bokant Hirosjima word verstrek.

2. Die fisiese effek daarvan op die inwoners van die stad word beskryf.

3. Die mees wydverspreide permanente effek moet gewyt word aan die flitsverbranding van slagoffers wat tussen 1,000 en 2,500 meter vanaf die hipomiddelpunt getref is.

4. Dit skyn asof die brandwonde in die meeste gevalle die agterkant van die hande, die arms en die rug self (in 'n poging tot selfbeskerming) geaffekteer het. Die linkersy is meer dikwels verbrand as die regtersy, moontlik omdat die slagoffers op daardie tydstip iets in die regterhand gedra het—boeke, 'n briewetassie, ens.

5. Die flitsverbranding het brandwonde van volle dikte op die vel en niks dieper as die vel nie veroorsaak.

6. Die verwantskap tussen hipertrofiese littekens en keloïed word bespreek.

7. Behandeling deur middel van plastiese chirurgie, soos uitgevoer tydens die tweede fase van die rehabilitasieskema wat deur die ‚Peace Centre Associates' in Hirosjima van stapel gestuur is, word bespreek.

8. Algemene kommentaar.

I would like to acknowledge my thanks to the Hiroshima Peace Centre Associates and to the Hiroshima Atom Bomb Patients Treatment Council who made the project possible.

I would like to thank the Directors of the Atom Bomb, the Municipal and the Prefectural Hospitals, who so kindly put their institutions at my disposal.

I would like to thank the doctors and friends in Japan and in New York for their confidence, assistance and friendship, and lastly to my two 'team mates' from South Africa who did so much to lighten what might otherwise have been an arduous task.

APPENDIX

HIROSHIMA PEACE CENTRE ASSOCIATES PROJECT: PHASE II

Atom bomb casualties examined	74
Burns	60

Burns of back and/or dorsum of shoulder, arm, elbow, forearm and/or hand 50
Operative procedures 63

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MEDICO-LEGAL SECTION · MEDIES-GEREGTELIKE AFDELING

BARRING CLAUSES IN CONTRACTS
BETWEEN MEDICAL PRACTITIONERS

Ro. *v.* W.*

In an application by a medical practitioner for an interdict restraining another practitioner, his previous assistant, from 'carrying on his practice' within a radius of four miles from applicant's surgery for a period of two years, in terms of the agreement he had entered into in employing his assistant, the latter contended that, as he had set up his surgery outside the area, he was complying with the agreement, although he resided in the area and attended patients in the area.

Held, that respondent was in breach of the clause.

Held, further, as the restraint was reasonable, that the interdict should be granted.

HOLMES, J.: This is an application by one medical practitioner for an interdict restraining another from carrying on his practice in a specified area for a certain time.

The applicant practises in the Southern suburbs of. . . . He has a surgery at . . . , and his practice is pretty well confined to a circular area the radius of which is 4 miles from the surgery. He says his practice is largely a family one, and he attends a great many patients in their homes. In March 1953 he engaged the respondent, who is a medical practitioner, as his professional assistant, at a salary of £100 a month, together with a free house in the area, and a car allowance of £5 a month, plus free petrol and oil. The contract, which was in writing, provided that after the first year, the respondent should be entitled to three weeks' leave a year on full salary. The employment was to continue indefinitely, subject to a month's notice on either side. The respondent undertook that during the continuance of the agreement he would, *inter alia,* not engage in medical practice on his own account, and would be on call at all reasonable times for the benefit of the applicant's patients, and would not disclose any professional secrets or any information in respect of the applicant's patients or his practice. Clause 13 was in the following terms:

'In the event of the termination at any time of the assistant's employment for any cause whatsoever, the assistant shall not for a period of two (2) years from the date of such termination carry on the practice of general medical practitioner either alone or in partnership with any other person or persons nor act as assistant to any persons or persons carrying on the practice of general medical practitioner within a radius equal to the shortest distance between the principal's surgery at ....., and ..... and on any breach of this clause by the assistant the principal shall have the right to make application for an interdict restraining the assistant from carrying on such practice or acting as such assistant.'

It was common cause that the radius or distance referred to was 4 miles as the crow flies.

The respondent's employment came to an end on 31 March 1954, after a year's association with the applicant. The applicant avers that during the following month the respondent, in breach of the said clause 13, carried on the practice of a general medical practitioner on his own account in the prohibited area. The applicant accordingly asks for an interdict restraining the respondent from so carrying on practice in such area, until 31 March 1956. He avers that the respondent, having been introduced to his patients, will cause him irreparable loss if he practises in the area. This averment appears to be denied by the respondent, but Mr. *Burne,* who appeared for him, conceded that he must have been introduced to the patients.

The legal principles to be applied in cases of this sort are settled. In general, restraints are contrary to public policy and void, and an employer is not entitled to be relieved of

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the competition, *per se,* of a former employee. But he may be able to prove the existence of special circumstances warranting a reasonable measure of protection for his practice or connection. For example in medical cases the nature of the employment may be such that the employee thereby becomes acquainted with the patients and acquires confidential information and personal knowledge of them. In such an event the employer would be entitled to protection against the employee's turning such confidential information and personal knowledge to his own advantage when he leaves—provided that the protection goes no further than is reasonably necessary for the safeguarding of the employer's interests. *Durban Rickshas* v. *Ball,* 1933 N.P.D. 479; *Thomson* v. *Nortier,* 1931 O.P.D. 147 at p. 152/3; *Estate Matthews* v. *Redelinghuys,* 1927 W.L.D. 307 at p. 314; *Lewin* v. *Sanders,* 1937 S.R. 147; *Routh* v. *Jones,* 1947 (1) A.E.R. 758.

As to the facts of the present case, it seems to me clear from the affidavits that the respondent did visit and attend certain patients in the area in question, after he left the applicant's employment. In fact, his own letter of 14 April 1954 speaks of his 'doing a round of calls' and of his 'consultations' with a certain patient. He is living with a Mr. & Mrs. . . . in a house in the area. He has caused to be transferred to this house the telephone number from the applicant's house which he occupied when in his employment. However, his surgery is in town, outside the area in question.

The respondent claims to be entitled to do what he is doing. His attitude is summed up in para. 6 of his affidavit, which is in the following terms:

'When the applicant and I entered into the agreement, annexure " A " to applicant's affidavit, out intention and meaning in using the words " carry on the practice of general medical practitioner " was not that I would, in all circumstances, be prohibited from attending patients within the area referred to. The essence of the restraint, according to our joint intention and meaning, was that I should not set up a surgery within the area referred to, and thereby (or by any other similar means) hold myself out as ready or willing to attend patients within the area and, as a result, attend to patients who would otherwise consult the applicant. The words quoted above were never intended to mean, nor in my respectful submission do they mean, that I am precluded from attending, within the area, to patients, who, having been advised of the termination of my agreement with the applicant, and having been offered the applicant's telephone number, decline to be attended by him, but request me to attend to them at their homes when they are unable to come to my surgery. I respectfully submit that my attending to such patients is not a breach of the restraint.'

As to the foregoing paragraph, I do not think it can avail the respondent, because, as Mr. *Fannin,* for the applicant, pointed out, one has to ascertain the intention of parties to a written contract from the words which they used, and if those words are plain and unambiguous, a party cannot depart from their ordinary meaning by saying that that is not what was intended. If a party could do that, there would be little point in entering into written contracts. In my view the expression 'shall not . . . carry on the practice of general medical practitioner' in clause 13 is plain and unambiguous. Its ordinary meaning seems to me to be that the respondent, as a general medical practitioner, is not to practise his calling in the area in question. It does not seem to me to matter that he has no surgery in the area. (Compare *Brampton* v. *Beddoes,* 7 L.T. 679.) He lives in the area, and there receives telephone messages from patients, and visits and attends them in their homes, and makes his round of calls, and gives consultations, all in this area. In these circumstances I think he is clearly in breach of the clause.

The next question is whether the clause is legally enforceable, in other words whether the applicant has proved circumstances warranting the protection sought. Mr. *Burne* disputed this. But what are the facts? The applicant is a general medical practitioner with a family practice, and he attends a great many patients in their homes. The respondent, as his assistant, was introduced to the patients. It seems to me inevitable that the respondent would, in the course of his work and his association with the applicant, acquire confidential information and personal knowledge of and from the patients. In the ordinary way, on leaving the employment he would be in a position to turn this confidential information and personal knowledge to his own use and advantage in his practice, to the detriment of the applicant's connection. Accordingly the applicant was in my view entitled to reasonable protection of his connection or goodwill. As to the extent of the protection, the period of 2 years seems to me very reasonable; and so does the area, for it is confined to the particular area in which the applicant practises and his patients live, and it leaves the respondent free to practise in all the other suburbs of . . . and to have his surgery in town. Indeed Mr. *Burne* conceded that he could not attack the reasonableness of the area or the period of 2 years.

It follows from all that I have said that the applicant is entitled to his interdict. The order is in these terms:

(*a*) An interdict is granted restraining the respondent, . . . , from carrying on the practice of a general medical practitioner either alone or in partnership with any other person or persons, or from acting as assistant to any person or persons carrying on such practice, within an area the radius of which is 4 miles as the crow flies from . . . , until 31 March 1956.

(*b*) The respondent must pay the costs.

OPSOMMING

In 'n aansoek deur 'n mediese praktisyn om 'n interdik wat 'n ander praktisyn, sy voormalige assistent, sal belet, om sy praktyk te beoefen binne 'n omtrek van 4 myl vanaf die applikant se spreekkamer gedurende 'n tydperk van 2 jaar, kragtens 'n ooreenkoms wat hy aangegaan het toe hy sy assistent in diens geneem het, het laasgenoemde beweer dat, aangesien hy sy spreekkamer buite die betrokke gebied geopen het, hy aan die bepalings van die ooreenkoms voldoen, hoewel hy binne die gebied woon, en pasiënte in die gebied behandel.

Daar is *beslis* dat die respondent die ooreenkoms verbreek het.

Daar is verder *beslis* dat, aangesien die beperking redelik is, die interdik toegestaan moet word.

PREPARATE EN TOESTELLE

TEMPOGEN

Tempogen is die jongste formulering van die adrenokortikale steroïede in 'n samestelling met salisilaat, askorbiensuur en teensuur.

Tempogen maak dit moontlik om 'n kleiner steroïeddosis voor te skryf en om 'n hoër mate van simptomatiese verligting aan die pasiënt te besorg. Dit stel die volle voordeel van steroïedterapie ook tot beskikking van 'n groter verskeidenheid van pasiënte—insluitende baie by wie die gebruik van steroïede alleen miskien nie raadsaam is nie.

Tempogen bevat:

Prednisoloon	1.0 mg.
Asetielsalisielsuur	300 mg.
Natriumaskorbaat	60 mg.
Aluminiumhidroksied-jel	200 mg.

Prednisoloon het 'n regstreekse ontstekingsbestrydingseffek. In samestelling met asetielsalisielsuur het dit ook 'n addisionele steroïed-salisilaat-effek. Hierdie samestelling maak dit onnodig om buitengewoon groot dosisse van sowel die steroïed as die salisilaat voor te skryf. Gevolglik word die neweeffekte verminder, maar die doeltreffende bestryding van pyn, styfheid en ontstekings word geensins geaffekteer nie.

Meer natriumaskorbaat word verskaf om positiewe beskerming te verleen teen verminderde adrenokortikale en murgweefsel-peile van Vitamien C as 'n gevolg van druk of salisilaatterapie.

Oorsurigheid en maagongesteldhede kom dikwels voor na die gebruik van steroïede of salisilate. Die aluminiumhidroksied-jel in die formule beskerm die pasiënt teen oorsurigheid, en word ingesluit in die regte verhouding na gelang van die hoeveelheid steroïed in die formule.

Die *dosis* hang af van die aard en die erns van die toestand wat behandel word en die reaksie op terapie. Die dosis behoort sorgvuldig by indiwiduele behoeftes aangepas te word om beheer op die laagste dosis-peil te verskaf. Die aanvanklike dosis is 1 tot 4 tablette 3 tot 4 maal per dag. Na 'n bevredigende reaksie, word dit geleidelik verminder tot die kleinste instandhoudingsdosis wat bevredigende resultate oplewer.

Hoe dit verskaf word: *Tempogen*-tablette in bottels van 10 en 30.

Vervaardiger: Merck Sharp & Dohme International, 'n Afdeling van Merck & Co. Inc.

Navrae: Posbus 5933, Johannesburg.

CODELCORTONE–T.B.A.

PREDNISOLOON TERSIÊRE-BUTIELASETAAT

Hierdie produk verteenwoordig 'n radikale uitbreiding en vooruitgang op die gebied van *plaaslike* steroïedterapie. Die steroïedformules wat vroeër vir plaaslike gebruik verkrygbaar was, kon net vir binne-sinoviale doeleindes aangewend word.

Codelcortone–T.B.A. is saamgestel vir *inspuiting in die sagte weefsels* sowel as vir binne-sinoviale inspuiting. As 'n binne-sinoviale inspuiting gegee word en 'n bietjie van die middel ontsnap toevallig na die omliggende sagte weefsel, sal dit geen prikkeling veroorsaak nie. Inteendeel sal dit 'n heilsame plaaslike effek op die omliggende sagte weelfsel hê. Inspuitings kan ook regstreeks in die sagte weefsel geskied.

Codelcortone–T.B.A. maak 'n groter verskeidenheid van plaaslike behandelings moontlik, met algehele vryheid van enige sistemiese effek. Hierdie behandelings kan oor 'n langer tydperk volgehou word en die geneesheer kan kleiner dosisse voorskryf.

Codelcortone–T.B.A. word aangedui vir die behandeling van peesontsteking, ‚hamervinger', Quervain se siekte, pees-gewrigsvliesontsteking, Dupuytren se verkorting, peritendinitis, peesknope, tenniselmboog, lumbosakrale ooreising, kapselontsteking, ‚bevrore' skouer, rumatiekagtige knoppies, coccydinie, fibrositis, kollaterale gewrigsbande, verrekings en verstuitings, radikulitis en been- en kraakbeenontsteking.

Codelcortone–T.B.A. word aangedui vir die plaaslike bestryding van pyn, swelsel, styfheid en ontsteking volgende op rumatiekagtige gewrigsontsteking, been- en gewrigsontsteking, chroniese traumatiese gewrigsontstekings, akute jigagtige gewrigsontsteking en baie soorte slymbeursontsteking.

Dosis: Leesstof wat breedvoerige besonderhede hieroor verstrek, is op aansoek verkrygbaar.

Let Wel: Binnegewrigsinspuitings moet nie gegee word in gevalle waar 'n spesifieke infeksie aanwesig is nie. Tussenwerwelbeengewrigte moet ***nie*** ingespuit word nie. Die enigste ongunstige effek is 'n verbygaande blos na die inspuiting wat egter vinnig verdwyn en slegs by 1% of minder van alle pasiënte voorkom. Dit word selde twee keer by dieselfde pasiënt aangetref.

Fabrikant: Merck Sharp & Dohme International, 'n Afdeling van Merck & Co. Inc.

Navrae: Posbus 5933, Johannesburg.

PREPARATIONS AND APPLIANCES

TEMPOGEN

Tempogen represents the latest formulation of adrenocortical steroids in combination with salicylate, ascorbic acid and antacid.

Tempogen provides lower steroid dosage with a higher level of symptomatic relief and extends the full benefits of steroid therapy to a wider range of patients—including many in whom the use of steroids alone may not be warranted.

Tempogen contains:

Prednisolone	1.0 mg.
Acetylsalicylic acid	300 mg.
Sodium ascorbate	60 mg.
Aluminium hydroxide gel	200 mg.

Prednisolone provides direct anti-inflammatory action. In combination with acetylsalicylic acid, an additive steroid-salicylate action is provided. This combination avoids exceedingly large doses of both steroid and salicylate thus reducing side effects but in no way reducing the effective control of pain, stiffness and inflammation.

More sodium ascorbate is provided to give more positive protection against reduced adrenocortical and medullary tissue levels of vitamin C as a result of stress or salicylate therapy.

Hyperacidity and gastric distress often occur following the use of steroids or salicylates. The Aluminium Hydroxide gel in the formula protects against hyperacidity and is included in proper proportion according to the amount of steroid in the formula.

Dosage depends on the nature and severity of the condition being treated and the response to therapy. Dosage should be carefully individualized to provide control at the lowest dosage levels. Initial dose is 1 to 4 tablets 3 to 4 times daily. After a satisfactory response, gradually reduce to the lowest satisfactory maintenance dose.

How Supplied: *Tempogen* Tablets in bottles of 10's and 30's.

Manufacturer: Merck Sharp & Dohme International, Division of Merck & Co. Inc.

Enquiries: P.O. Box 5933, Johannesburg.

CODELCORTONE-T.B.A.

PREDNISOLONE TERTIARY-BUTYLACETATE

This product represents a radical extension and advance in *local* steroid therapy. Previously available steroid formulations for localized effect were confined to intra-synovial use.

Codelcortone-T.B.A. is designed for *soft tissue injection* as well as intra-synovial injection. When making intra-synovial injection, should some of the material accidentally be introduced into surrounding soft tissue, no irritation occurs and indeed to the contrary beneficial local effect on the surrounding soft tissue results. Also injections are made directly into soft tissue.

Codelcortone-T.B.A. provides a wider range of local treatment with freedom from systemic effects extending over more prolonged periods of time and achieved at a lower dosage level.

Codelcortone-T.B.A. is indicated in the treatment of tendinitis, trigger finger, Quervain's disease, tenosynovitis, Dupuytren's contracture, peritendinitis, ganglia, tennis elbow, lumbosacral strain, capsulitis, frozen shoulder, rheumatoid nodules, coccydynia, fibrositis, collateral ligament, strains and sprains, radiculitis and osteochondritis.

Codelcortone-T.B.A. is indicated for local control of pain, swelling, stiffness and inflammation in rheumatoid arthritis, osteoarthritis, chronic traumatic arthritides, acute gouty arthritis and in many types of bursitis.

Dosage: Detailed literature available on request.

Note: Intra-articular injection should not be done in the presence of specific infection. Intervertebral joints should *not* be injected. The only untoward effect is a transient post-injection flare which rapidly passes and occurs in 1% or less of the patients and seldom recurs in the same patient.

How Supplied: *Codelcortone*-T.B.A. 20 mg. per c.c. in 5 c.c. vials.

Manufacturer: Merck Sharp & Dohme International, Division of Merck & Co. Inc.

Enquiries: P.O. Box 5933, Johannesburg.

NOTES AND NEWS · BERIGTE

Dr. H. Moross, Medical Superintendent of Tara Hospital, Johannesburg, has been elected to the Executive Board of the World Federation of Mental Health.

South Africa is the only state on the African continent to have representation on this Board which is associated with UNESCO, WHO and the UN Children's Fund.

The object of the World Federation of Mental Health is the promotion of higher standards of mental health in its broadest aspects amongst all peoples and all nations.

Dr. Moross is well known for his important contributions to psychiatric work, especially relating to general hospitals. He is also the author of a chapter in Prof. E. H. Cluver's textbook on *Social Medicine*, and is responsible for several publications including a WHO Working Document (in collaboration with Dr. L. S. Gillis) entitled *Organization and Operational Concepts of Tara Psychiatric Hospital*.

Dr. Moross' appointment to the Executive Board of WFMH constitutes signal recognition of the eminent regard in which this field of medical practice in South Africa is held overseas.

* * *

Mr. Arthur J. Helfet, F.R.C.S. and Dr. G. Dall have moved to 904 Medical Centre, Heerengracht, Cape Town. (Telephone: *Rooms*: 3-2409; *Residence*: 6-8527 (Mr. Helfet); 69-1915 (Dr. Dall).

* * *

Dr. S. P. Josman has commenced practice as a specialist anaesthetist at 47 Jenner Chambers, Jeppe Street, Johannesburg. (Telephones: *Rooms*: 23-8727; *Residence*: 46-3714).

Cortisone vs. Salicylate in Rheumatoid Arthritis

Latest clinical report proves cortisone no better than aspirin in the treatment of rheumatoid arthritis.

On May 29th, 1954, the Joint Committee of the Medical Research Council and Nuffield Foundation published a most significant finding on arthritis therapy—that "for practical purposes" there appears to be "*surprisingly little to choose between cortisone and aspirin.*"[1]

"Sixty-one patients in the early stages of rheumatoid arthritis . . . have been allocated at random to treatment with one or other agent (cortisone 30 cases, aspirin 31 cases) . . .

"Observations made one week, eight weeks, thirteen weeks, and approximately one year after the start of treatment reveal that the two groups have run a closely parallel course in nearly all the recorded characteristics—namely, joint tenderness, range of movement in the wrist, strength of grip, tests of dexterity of hand and foot, and clinical judgments of the activity of the disease and of the patient's functional capacity."[1]

These findings spotlight an earlier report that "aspirin in large doses has definite beneficial results closely akin to those received from ACTH."[2]

***High gastric intolerance to aspirin noted among arthritics—a problem easily met by the use of* BUFFERIN.**

In this latest study, the side-effects recorded for both groups "were equal in the early months of treatment, but *became less in the aspirin group as time passed.*"[1]

Of clinical significance, however, is the high percentage of gastric intolerance to straight aspirin found among the arthritic patients—42% *as against* 3 *to* 10% *variously reported for the general population.*[3, 4]

Earlier investigations reveal the disadvantages of using sodium bicarbonate with aspirin—namely, the lowering of blood salicylate levels and the possible retention of the sodium ion.[2]

BUFFERIN *offers an answer to this problem.*

Unlike straight aspirin, BUFFERIN *is well tolerated, even when given in large doses.*[4]

BUFFERIN contains no sodium. It combines aspirin with two antacid and buffering agents which protect the gastric mucosa against irritation from salicylates—at the same time providing faster absorption of salicylates into the blood stream.

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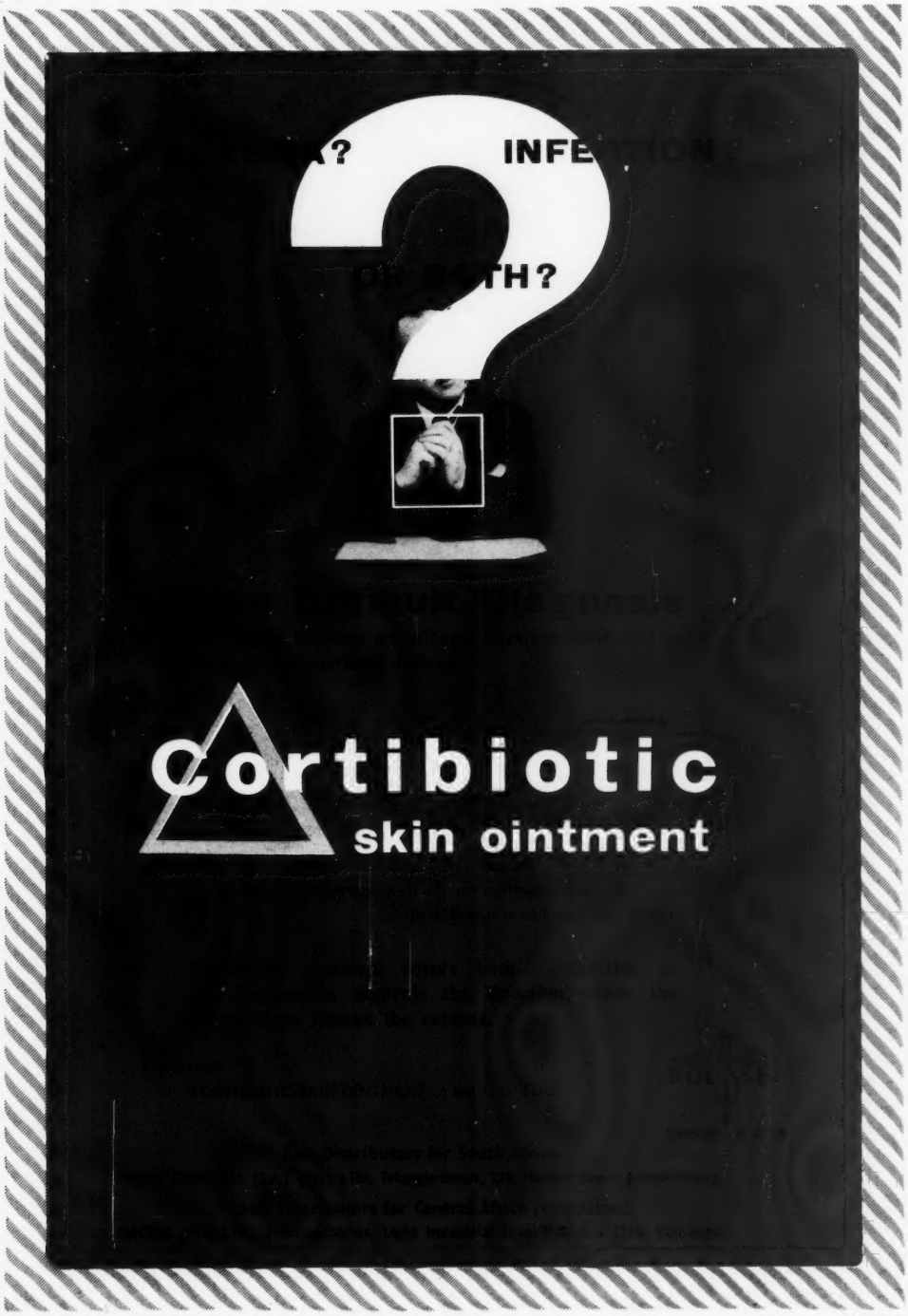

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